CLAIMS

1. A brushless DC motor comprising:

a rotor having plural permanent magnets; and

a stator having plural slots,

wherein said rotor is divided into three rotor blocks in a rotation axis direction, and said three rotor blocks are layered so that arrangement angles of said rotor blocks differ from each other by an amount of a mechanical angle in a rotary direction that is equivalent to one third of a pulsation period of cogging torque generated by said rotor and stator.

2. The brushless DC motor of claim 1,

wherein a sum of an effective polar opening angle of one of said permanent magnets and a difference between the arrangement angles of said rotor block located on one end and said rotor block located on the other end is not more than a pole pitch angle of said rotor.

3. A brushless DC motor comprising:

a rotor having plural permanent magnets; and

a stator having plural slots,

wherein each of said permanent magnets is divided into three permanent magnets in a rotation axis direction, and said three permanent magnets are layered so that arrangement angles of said permanent magnets differ from each other by an amount of a

mechanical angle in a rotary direction that is equivalent to one third of a pulsation period of cogging torque generated by said rotor and stator.

4. The brushless DC motor of claim 3,

wherein a sum of an effective polar opening angle of one of said permanent magnets and a difference between the arrangement angles of said permanent magnets located on both ends in the rotation axis direction of said three permanent magnets is not more than a pole pitch angle of said rotor.

5. A brushless DC motor comprising:

a rotor having plural magnetic poles provided at an equal pitch in a circumferential direction by mounting permanent magnets in magnet mounting holes; and

a stator having plural slots arranged at an equal pitch in a circumferential direction,

wherein the magnetic poles of said rotor include magnetic poles whose magnet deviation angle formed by a central line of an effective polar opening angle and a central line of said magnet mounting hole is a first angle; and magnetic poles whose magnet deviation angle is a second angle different from the first angle.

6. The brushless DC motor of claim 5,

wherein a difference θ6 between said second angle and

said first angle is within a range defined by

$$0.2 \times \theta 7 \leq \theta 6 \leq \theta 5 - (0.2 \times \theta 7)$$

where θ5 is a slot pitch angle of said stator, and θ7 is a slot opening angle of said stator.

7. The brushless DC motor of claim 5,

wherein the number of the magnetic poles whose magnet deviation angle is the first angle and the number of the magnetic poles whose magnet deviation angle is the second angle are equal to each other.

8. The brushless DC motor of claim 5,

wherein the magnetic pole whose magnet deviation angle is the first angle and the magnetic pole whose magnet deviation angle is the second angle are arranged next to each other on said rotor.

9. The brushless DC motor of claim 5,

wherein said rotor is divided into plural bocks in a rotation axis direction, and the magnetic pole whose magnet deviation angle is the first angle and the magnetic pole whose magnet deviation angle is the second angle are arranged at corresponding positions in the rotation axis direction in different blocks.

10. The brushless DC motor of claim 6,

wherein the magnetic poles of said rotor further include magnetic poles whose magnet deviation angle is a third angle different from said first and second angles, and a difference between the third angle and the first angle has the same value as and opposite sign to a difference between the second angle and the first angle.

11. The brushless DC motor of claim 10,

wherein the number of the magnetic poles whose magnet deviation angle is the first angle, the number of the magnetic poles whose magnet deviation angle is the second angle and the number of the magnetic poles whose magnet deviation angle is the third angle are equal to each other.

12. The brushless DC motor of claim 11,

wherein a total number of the magnetic poles of said rotor is an integral multiple of 6, and all of the magnetic poles of said rotor are any magnetic pole among the magnetic poles whose magnet deviation angle is the first angle, the magnetic poles whose magnet deviation angle is the second angle and the magnetic poles whose magnet deviation angle is the third angle.

13. A brushless DC motor comprising:

a rotor having plural magnetic poles provided at an equal

pitch in a circumferential direction by mounting permanent magnets in magnet mounting holes; and

a stator having plural slots arranged at an equal pitch in a circumferential direction,

wherein said rotor comprises convex portions corresponding to the magnetic poles on its circumference, and the magnetic poles of said rotor include magnetic poles whose convex portion deviation angle formed by a central line of said convex portion and a central line of said magnet mounting hole is a first angle; and magnetic poles whose convex portion deviation angle is a second angle different from the first angle.

14. A brushless DC motor comprising:

a rotor having plural magnetic poles provided at an equal pitch in a circumferential direction by mounting permanent magnets in magnet mounting holes; and

a stator having plural slots arranged at an equal pitch in a circumferential direction,

wherein said rotor comprises convex portions corresponding to the magnetic poles on its circumference, and the magnetic poles of said rotor include magnetic poles whose magnet deviation angle formed by a central line of an effective polar opening angle and the central line of said magnet mounting hole and whose convex portion deviation angle formed by a central line of said convex portion and a central line of said magnet mounting

hole are both first angle; and magnetic poles whose magnet deviation angle and convex portion deviation angle are both second angle different from the first angle.

15. A brushless DC motor comprising:

a stator constructed by layering plural steel plates, said stator including a yoke on an outer circumferential portion, plural teeth extending from said yoke toward a central portion, and notch portions or cavity portions in an outer circumferential surface of said yoke,

wherein said steel plates are layered while displacing said steel plates at a predetermined angle in a circumferential direction so that a length of said notch portions or said cavity portions of each of said teeth in a layering direction of said steel plates is substantially equal.

16. The brushless DC motor of claim 15,

wherein a substantially equal number of said steel plates are layered at an equal angle to form blocks, and said steel plates are layered while displacing said blocks at a predetermined angle in a circumferential direction.

17. The brushless DC motor of claim 15,

wherein said notch portions or cavity portions are formed in said steel plates for every other tooth.

18. The brushless DC motor of claim 15,

wherein said notch portions or cavity portions are arranged so that adjacent notch portions or cavity portions of the angularly displaced steel plates in a cross sectional view in the layering direction are in point contact with or separated from each other.

19. A method of manufacturing a brushless DC motor of claim 1,

wherein said permanent magnets of said rotor are produced by magnetizing said rotor blocks or rotor by using said stator as a magnetic yoke after assembling the motor.